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EXAMINER

COUSO, JOSE L

ART UNIT

PAPER NUMBER

2621

DATE MAILED: 03/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/029,135	Applicant(s) PRAKASH ET AL.	
	Examiner Jose L. Couso	Art Unit 2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-60 is/are pending in the application.
 4a) Of the above claim(s) 1,41,44 and 51-60 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 2-40, 42-43 and 45-50 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>5/28/02, 1/17/03.</u> | 6) <input type="checkbox"/> Other: ____. |

Election/Restriction

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claim 1, drawn to a method of efficiently encoding a portion of a digital image frame, classified in class 382, subclass 236.
 - II. Claims 2-40, 42-43 and 45-50, drawn to a method of encoding a color image, classified in class 382, subclass 166.
 - III. Claims 41 and 53-54, drawn to a method of determining whether tentative fill segments chosen approximate the actual value of the exposed area, classified in class 382, subclass 243.
 - IV. Claims 44 and 56-57, drawn to a method of determining predictive values for segments, classified in class 375, subclass 240.12.
 - V. Claims 51-52, drawn to a method of determining a final set of segment if a recalculation is performed, classified in class 358, subclass 426.1.
 - VI. Claim 55, drawn to a method of efficiently encoding exposed areas with multiple regions, classified in class 358, subclass 450.
 - VII. Claims 58-59, drawn to a method of transmitting identities of the fill segments to a decoder, classified in class 358, subclass 426.12.
 - VIII. Claim 60, drawn to a method of coupling fill segment information with any set of residue encoder, classified in class 348, subclass 425.2.

2. The inventions are distinct, each from the other because of the following reasons:

Inventions in Group I and Group II-VIII are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, the inventions in Groups I-VIII have separate utility such as a coding device and a decoding device using various techniques. See MPEP 806.05(d).

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

3. During a telephone conversation with Mr. James K. Okamoto on December 3, 2004 a provisional election was made without traverse to prosecute the invention of Group II, claims 2-40, 42-43 and 45-50. Affirmation of this election must be made by applicant in replying to this Office action. Claims 1, 41, 44 and 51-60 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Office Action

4. Claim 47 is objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim cannot depend from another multiple dependent claim. See MPEP § 608.01(n). Accordingly, the claim 47 has not been further treated on the merits.

5. Claims 2-40, 42-43 and 45-50 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The following terms in claim 2 lack a suitable antecedent: "the boundary" in lines 3-4; and "the exposed area" in line 4. Additionally "each unfilled pixel" has not been clearly defined. What exactly is an "unfilled pixel"? When and how has a pixel been unfilled?

The following term in claim 4, "adjacent segment", has not been clearly defined. What exactly is an "adjacent"? Claim 3, from which claim 4 depends, defines an adjacent pixel to a segment. Not an "adjacent segment".

The following terms in claim 5 lack a suitable antecedent: "the actual color values of the pixel" in line 2; "the pixel" in line 2; and "the segment" in lines 3-4. It is unclear to which segment applicant is referring. Is it "the boundary segment" or is it "the segment" to which each pixel is adjacent?

The following terms in claim 6 lack a suitable antecedent: "the pixel" in line 1; "the segment adjacent" in line 2; "the selected pixel" in line 2; "the smallest difference" in line 3; and "the calculated statistical parameter" in line 2.

The following terms in claim 7 lack a suitable antecedent: "the pixel" in line 1; "the segment identifier" in lines 1-2; "the segment adjacent" in line 2; "the selected pixel" in line 2; "the smallest difference" in line 2; "the actual color value of that pixel" in line 3; and "the calculated statistical parameter" in line 3.

The following terms in claim 8 lack a suitable antecedent: "the difference" in line 2; "the actual color value of that pixel" in line 2; and "the calculated statistical parameter" in lines 2-3.

The following terms in claim 9 lack a suitable antecedent: "the threshold value" in lines 2-3; and "the current threshold" in line 3.

The following recitation in claim 11, "repeating the steps in claims 2 through 7", has not been clearly defined. The various claims recited have different dependencies, thus claim 11 does not in fact carry out all of the steps of the various claims because some of the dependent claims are not in the chain of steps nor do they recite the same elements.

The following terms in claim 16 lack a suitable antecedent: "the exposed area" in line 3; "the boundary segments" in line 4; "the geometric shape" in line 5. Additionally "pixels within the exposed area that are filled" has not been clearly defined. What exactly are "pixels ... that are filled"? When have the pixels been filled and how?

The following terms in claim 17 lack a suitable antecedent: "the perimeter length" in line 2; and "the area" in line 2.

The following terms in claim 18 lack a suitable antecedent: "the perimeter length" in line 2; and "the area" in line 2.

The following terms in claim 19 lack a suitable antecedent: "the filled region" in lines 3-4; and "the region filled by this segment" in line 7.

The following term in claim 20, line 2, "the segments" lacks a suitable antecedent.

The following term in claim 21, line 2, "the segments" lacks a suitable antecedent.

The following terms in claim 22 lack a suitable antecedent: "the perimeter lengths" in line 2; "the tentative filled segments" in line 2; and "the perimeter of the exposed area" in lines 2-3.

The following term in claim 23 "the perimeter lengths" in lines 1 and 2, lacks a suitable antecedent.

The following terms in claim 24 lack a suitable antecedent: "the areas of the regions" in line 2; "the areas of regions" in line 2; and "the tentative fill segments" in line 2.

The following term in claim 25, "the areas" in lines 1 and 2, lacks a suitable antecedent.

The following term in claim 26, "the ratios" in line 2, lacks a suitable antecedent.

The following term in claim 27, "the ratios" appearing twice in line 2, lacks a suitable antecedent.

The following terms in claim 28 lack a suitable antecedent: "the segment" in line 2; "the value" in line 3; and "the normalized length" in line 3. Additionally, the following recitation in line 2, "repeating the steps in claims 15 through 26", has not been clearly defined. The various claims recited have different dependencies, thus claim 28 does not in fact carry out all of the steps of the various claims because some of the dependent claims are not in the chain of steps nor do they recite the same elements. The examiner would like to point out that some claims depend from independent claim 2, while others depend from independent claim 16.

The following term in claim 29, lines 1-2, "the steps in claim 15" lacks a suitable antecedent.

The following term in claim 30, line 2, "the filled segments" lacks a suitable antecedent.

The following terms in claim 31 lack a suitable antecedent: "the boundary" in lines 3-4; and "the exposed area" in line 4. Additionally "each unfilled pixel" has not

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been clearly defined. What exactly is an "unfilled pixel"? When and how has a pixel been unfilled?

The following term in claim 33, lines 2-3, "the said statistical distribution of colors" lacks a suitable antecedent.

The following term in claim 34, lines 1-2, "the segment identifier" lacks a suitable antecedent.

The following term in claim 35, line 3, "said region" lacks a suitable antecedent.

The following recitation in claim 36, line 2, "repeating the steps in claims 18 through 22", has not been clearly defined. The various claims recited have different dependencies, thus claim 36 does not in fact carry out all of the steps of the various claims because some of the dependent claims are not in the chain of steps nor do they recite the same elements. The examiner would like to point out that some claims depend from independent claim 2, while others depend from independent claim 16.

The following term in claim 39, line 1, "the statistical parameter" lacks a suitable antecedent.

The following term in claim 42, lines 2-3, "the absolute values of the color differences between the actual values and the reference fill values" lacks a suitable antecedent.

The following term in claim 43, lines 2-3, "the absolute values of the color differences between the actual values and the reference fill values" lacks a suitable antecedent.

The following term in claim 45, lines 2-3, "the absolute values of the color differences between the actual values and the reference fill values" lacks a suitable antecedent.

The following term in claim 46, lines 2-3, "the absolute values of the color differences between the actual values and the reference fill values" lacks a suitable antecedent.

The following terms in claim 47 lack a suitable antecedent: "the actual values" in line 4; "the reference fill values" in line 4; "the function of the actual values and the predictive fill values" in lines 4-5"; and "the rejected segment or segments". Additionally, the following recitation "Repeating the steps described in claims 2 through 29", has not been clearly defined. The various claims recited have different dependencies, thus claim 47 does not in fact carry out all of the steps of the various claims because some of the dependent claims are not in the chain of steps nor do they recite the same elements. The examiner would like to point out that some claims depend from independent claim 2, while others depend from independent claim 16. Furthermore, claim 47 consist of plural sentences, a claim should be only one sentence long.

The following term in claim 48, lines 2-3, "the absolute values of the color differences between the actual values and the reference fill values" lacks a suitable antecedent.

The following term in claim 49, lines 2-3, "the absolute values of the color differences between the actual values and the reference fill values" lacks a suitable antecedent.

Claims 3, 10, 12-13, 14-15, 32, 36-38 and 50 variously depend from indefinite claims.

Furthermore, Claim 47 is objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim cannot depend from a multiple dependent claim. See MPEP § 608.01(n).

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 2-40, 42-43 and 45-50, as best understood, are rejected under 35 U.S.C. 102(b) as being anticipated by Lee et al. (U.S. Patent No. 5,748,789).

As to claim 2, Lee describes considering a region of adaptive dimensions around each unfilled pixel at the boundary of the exposed area (see figure 31, elements 1132 and 1134, and refer for example to column 37, line 48 through column 38, line 8 and

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column 41, lines 9-24 [the later portion discusses transparency pixels on a boundary which can be pixels from one or more objects which overlap thus causing boundary which are discontinuities or unfilled pixels, as described in a little more detail in column 40, lines 35-52]); and determining the statistical distribution of colors for all pixels within the region belonging to each boundary segment (refer for example to column 42, line 61 through column 42, line 6 and column 42, line 55 through column 44, line 4, which discusses the overhead and number of bits needed to encode the object's texture and motion data which are two statistical distributions, and see figures 15 and 17 and refer to column 22, lines 46-52 and column 24, lines 46-50 which obtain ratios of variance of color distributions and averages respectively). The examiner will like to point out that Lee discusses boundary segments and uses the term "assigned values" and "unassigned values" for pixels on segments which have and do not values respectively. Lee also uses the term transparency values for pixels to indicate that certain pixels are found on different objects and the boundary segments associated with those pixels will have some boundary disruptions or discrepancies, i.e. unassigned values.

In regard to claims 3 and 32, Lee describes determining to which segment each pixel is adjacent (see figures 25A-C and refer for example to column 30, lines 48-51).

With regard to claim 4, Lee describes calculating a statistical parameter of the color values for each adjacent segment determined from the said statistical distribution of colors (see figure 17A, elements 422 and 426 and refer for example to column 24, lines 46-50).

As to claim 5, Lee describes calculating the difference between the actual color values of the pixel and the value of the calculated statistical parameter for each boundary segment and identifying the smallest difference value and the segment which provides the smallest difference value (see figure 31 and refer for example to column 39, lines 33-43).

In regard to claim 6, Lee describes comprising filling the pixel with the value of the calculated statistical parameter of the segment adjacent to the selected pixel that has the smallest difference if this difference is less than a threshold value (see figure 32, element 1164 and refer for example to column 41, lines 25-31).

With regard to claim 7, Lee describes assigning to the pixel, the segment identifier of the segment adjacent to the selected pixel that has the smallest difference between the actual color value of that pixel and the calculated statistical parameter if this difference is less than a threshold value (see figure 32, element 1164 and refer for example to column 41, lines 25-31, the boundary identification in column 41, lines 1 and 40-67 corresponds to applicant's segment identifier).

As to claim 8, Lee describes leaving the pixel unfilled if the difference between the actual color value of that pixel and the calculated statistical parameter is greater than a threshold value (see figure 32, element 1164 and refer for example to column 41, lines 25-31).

In regard to claim 9, Lee describes increasing the threshold value if a certain percentage or less of pixels can be filled with the current threshold (see figure 32,

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element 1164 and refer for example to column 41, lines 28-31, which discusses the threshold is adapted to various shapes thus implying different thresholds).

With regard to claim 10, Lee describes where the percentage of pixels is zero (refer for example to column 41, lines 25-26).

As to claim 11, Lee describes repeating the steps in claims 2 through 7 for each unfilled pixel at the boundary of the exposed area until the entire exposed area is filled (see figures 15, 17A-B, 25A and 31-32 all of which are flowcharts which a computer reiterates through until the area is filled).

With regard to claims 12 and 37, Lee describes where statistical distributions of three color components Y, U, V are determined (refer for example to column 25, lines 38-65, where the color components are identified as Y,U,V in column 42, lines 66-67 for example).

In regard to claims 13 and 38, Lee describes where statistical distributions of each component of a multi-spectral image is determined (refer for example to column 25, lines 38-65).

With regard to claims 14 and 39, Lee describes where the statistical parameter is the median color value of the statistical distribution (refer for example to column 25, lines 38-65).

As to claims 15 and 40, Lee describes where the statistical parameter is any statistical moment of the distribution of color values (refer for example to column 25, lines 38-65).

In regard to claim 16, Lee describes calculating the percentage of pixels within the exposed area that are filled by each of the boundary segments (see figure 15 and refer for example to column 22, line 45 through column 23, line 15); calculating a parameter that represents the geometric shape of the area filled by each of the boundary segments (refer for example to column 37, lines 8-47).

With regard to claim 17, Lee describes where the parameter representing the geometric shape is a function of the perimeter length, or a function of the area (refer for example to column 23, line 63 through column 24, line 15).

As to claim 18, Lee describes where the parameter representing the geometric shape is a function of both the perimeter length and the area (refer for example to column 23, line 63 through column 24, line 15).

In regard to claim 19, Lee describes selecting a set of tentative segments, comprises the steps of selecting a segment as a tentative segment, if their contribution to the filled region is greater than a predetermined contribution of all of the boundary segments (refer for example to column 24, line 16 through column 25, line 5); selecting a segment as a tentative segment, if their contribution is less than the predetermined contribution but greater than a certain threshold value, and the geometric parameter of the region filled by this segment is within a threshold range (refer for example to column 24, line 16 through column 25, line 5); rejecting a segment as a tentative fill segment if one of the above two criteria are not met (refer for example to column 24, line 16 through column 25, line 5).

With regard to claim 20, Lee describes where the predetermined contribution is the average contribution of all of the segments (see figure 17A, element 426 and refer for example to column 24, lines 16 -21).

As to claim 21, Lee describes where the predetermined contribution is any statistical parameter of all of the segments (see figure 17A, element 426 and refer for example to column 24, lines 16 -21).

With regard to claim 22, Lee describes calculating a function of the perimeter lengths that each of the tentative fill segments contribute to the perimeter of the exposed area (refer for example to column 23, line 63 through column 24, line 15)..

As to claim 23, Lee describes where the function of the perimeter lengths is the normalized ratio of the squares of the perimeter lengths (refer for example to column 40, lines 35-52).

With regard to claim 24, Lee describes calculating a function of the areas of the regions contributed by the each of the tentative segments (see figure 15 and refer to column 22, line 45 through column 23, line 6).

As to claim 25, Lee describes where the function of the areas is the normalized ratio of the areas (see figure 15 and refer to column 22, line 45 through column 23, line 6, where the normalization is discussed in column 40, lines 41-52).

In regard to claim 26, Lee describes comprising calculating a function of the difference between the ratios(see figure 15 and refer to column 22, line 45 through column 23, line 6).

With regard to claim 27, Lee describes where the function of the difference between the ratios is the sum of the absolute values of the difference between the ratios (see figure 15 and refer to column 22, line 45 through column 23, line 6).

As to claim 28, Lee describes repeating the steps in claims 15 through 26 after excluding the segment where the value obtained by subtracting the normalized area from the normalized length squared is the greatest (see figures 15, 17A-B, 25A and 31-32 all of which are flowcharts which a computer reiterates through until the area is filled, the threshold and if conditions in the flowcharts eliminate unwanted and unnecessary segments, such as those that differences are greatest); determining if the sum of the absolute values of the differences recalculated in this step is smaller than that obtained in the previous calculation of the same parameter (refer for example to column 39, lines 45-67).

In regard to claim 29, Lee describes repeating the steps in claim 15 until the sum of the absolute values of the difference is greater than that calculated during the previous recalculation (see figure 31 which is a flowchart which a computer reiterates through until the area is filled, the threshold and if conditions in the flowcharts calculate and recalculate all conditions, such as a difference which is greatest).

With regard to claim 30, Lee describes selecting the segments used to calculate the lowest sum of absolute values of the differences as the fill segments (see figure 31 and refer for example to column 39, lines 45-67).

As to claim 31, Lee describes considering a region of adaptive dimensions around each unfilled pixel at the boundary of the exposed area and determining the

statistical distribution of colors for all pixels within the region belonging to each boundary segment (see figures 17A-B and refer for example to column 24, lines 26-60).

In regard to claim 33, Lee describes calculating a statistical parameter of the color values for each adjacent segment determined from the said statistical distribution of colors (see figures 17A-B and refer for example to column 24, lines 26-60).

With regard to claim 34, Lee describes comprising assigning to the pixel, the segment identifier of the segment that contributes the greatest number of pixels to the said region of adaptive dimensions around the pixel (see figure 32, element 1164 and refer for example to column 41, lines 25-31, the boundary identification in column 41, lines 1 and 40-67 corresponds to applicant's segment identifier).

As to claim 35, Lee describes repeating the steps in claims 18 through 22 for each unfilled pixel at the boundary of the exposed area until the entire exposed area is filled (see figures 15, 17A-B, 25A and 31-32 all of which are flowcharts which a computer reiterates through until the area is filled).

In regard to claim 36, Lee describes filling the pixel with the value of the statistical parameter of the segment that contributes the greatest number of pixels to the said region of adaptive dimensions around the pixel (see figure 17A-B and refer for example to column 23, line 63 through column 25, line 5).

As to claims 42-43, 45-46 and 48-49, Lee describes where the function of the actual values and the reference fill values is the average of the absolute values of the color differences between the actual values and the reference fill values (see figure

17A, elements 422 and 426 and refer for example to column 24, lines 46-50, wherein the predictive and reference fill values are one and the same in Lee).

In regard to claim 47, Lee describes rejecting the segment or segments if, for any segment, the value obtained by subtracting the function of the actual values and the reference fill values, from the function of the actual values and the predictive fill values is above a threshold (see figure 31 and refer for example to column 38, line 66 through column 39, line 58); repeating the steps described in claims 2 through 29 after excluding the rejected segment or segments (see figures 15, 17A-B, 25A and 31-32 all of which are flowcharts which a computer reiterates through until the area is filled, the threshold and if conditions in the flowcharts exclude the rejected segment or segments).

With regard to claim 50, Lee describes where recalculation is carried out multiple times (see figures 15, 17A-B, 25A and 31-32 all of which are flowcharts which a computer reiterates through until the area is filled, the threshold and if conditions in the flowcharts calculate and recalculate multiple times).

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Frank, Stone et al., Wittenburg, Roth and Itoh all disclose systems similar to applicant's claimed invention.

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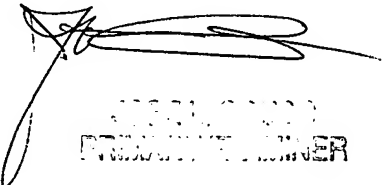
9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jose L. Couso whose telephone number is (703) 305-4774. The examiner can normally be reached on Monday through Friday from 6:30 to 3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Boudreau, can be reached on (703) 305-4706. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-8576.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jlc
December 10, 2004



JOSE L. COUSO
PATENT EXAMINER